July 2000 • NREL/MP-540-27702

HEV Information Needs Study—Summary of Results

M. V. Whalen

National Renewable Energy Laboratory

1617 Cole Boulevard
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Executive Summary

Hybrid electric vehicles (HEVs) are attracting increased interest from fleet operators throughout the United States. As these technologies are advancing, the U.S. Department of Energy's (DOE's) Office of Technology Utilization is developing projects to evaluate HEVs. One important aspect of developing appropriate projects is assessing the types of information that potential advanced vehicle users require to make informed decisions about vehicle purchases and fleet implementation. We designed the HEV Information Needs Study to characterize the types of information needed by potential HEV users. This report provides the characteristics of the fleets interviewed, followed by information on experiences with alternative fuel vehicles (AFVs, which includes vehicles fueled by compressed natural gas [CNG], liquefied petroleum gas [LPG], electricity, and alcohols) and on awareness of HEVs and advanced technology vehicles. In addition, the report summarizes and discusses the results of the information needs survey.

We completed 244 interviews, making an effort to be geographically diverse and to represent the various classes of the vehicles in use. The overall results provide feedback from a varied fleet experience base, including vehicle classes from light-duty to heavy-duty vehicles, and fleets ranging in size from less than 10 to more than 1000 vehicles. A total of 1,299,850 vehicles were represented by the respondents.

Before discussing the major results, it is important to understand something about the respondents' experience and knowledge of vehicle technology.

- Nearly 74% of the respondents indicated some experience with operating AFVs. About 53% reported that their AFV experience has been very favorable or favorable, 24% rated their experience as neutral, and nearly 23% rated their AFV experience as negative or very negative.

- Just over half the respondents (52.5%) indicated that they are required to include AFVs or low-emission vehicles (LEVs) in their vehicle purchases. Nearly 30% more public than private fleet respondents (64.3% compared to 35.6%) indicated they are under such a requirement or directive.

- The most commonly reported barrier to AFV use and fleet implementation was infrastructure, including a lack of fueling stations and the cost to build them, followed by cost (including acquisition and operating costs), range, vehicle availability, and performance issues. These issues and barriers are also likely to be of concern to fleets and vehicle operators who are considering advanced technology vehicles.

- More than 78% of the respondents indicated that they know something about HEVs. Nearly 63% believe there are specific applications that HEVs can meet in their fleets. About 24% do not know if HEVs can meet any of their fleet needs.

- The majority of respondents (63.5%) said the factors they considered when making vehicle purchase decisions would not change for HEVs or other advanced technology vehicles. The top factors considered when making vehicle purchase decisions are cost, vehicle availability/suitability, reliability/durability, and performance.

The major study findings and results related to HEV and advanced technology vehicle information needs included:

- There is clearly a strong interest in vehicle performance and cost information. The five highest ranked information need categories, each receiving critical or important ratings from at least 80% of the

respondents, were reliability/durability, driving range, operating costs, vehicle specifications, and vehicle costs. Although not performance- or cost-related, infrastructure was also ranked as critical or important by more than 80% of the respondents. There is also a need for information on special support, which includes information on maintenance differences, special equipment needs, dealership service, and technician training.

- For nearly all information categories, more public- than private-fleet respondents indicated that information needs were critical or important. The biggest difference was in the need for emissions information, with nearly 25% more public-fleet respondents indicating this is a critical or important need.

- Nearly 88% of the respondents indicated trade publications are currently their primary source of information on advanced technology vehicles and trends. More than 50% of the respondents also indicated vehicle manufacturers and the federal government are sources of this type of information.

- Nearly 90% of the respondents said they prefer to get advanced technology vehicle information from industry publications. Other preferred methods include the Web/Internet, government publications, and direct mail.

- High percentages were reported for most preferred information sources. This suggests that no one type of information source is used exclusively, and that fleet operators are likely to explore a number of sources for information on HEVs.

Introduction

The U.S. Department of Energy (DOE) is actively involved in demonstrating the viability of alternative fuel vehicles (AFVs) and other advanced technology vehicles, and in providing vehicle performance information to those responsible for vehicle purchases. Through its Field Operations Program, DOE's Office of Technology Utilization works to facilitate the transition of advanced technologies from the research and development (R&D) stages into the marketplace. Information on AFVs, advanced technology vehicle performance, and fleet experiences is collected through various test and evaluation projects. Based on these projects, the Field Operations Program is able to provide accurate and objective information on the performance of the latest technology vehicles.

Hybrid electric vehicles (HEVs) are attracting increased interest from fleet operators throughout the United States. Using a combination of commercially established and still-developing fuel sources and emerging electric vehicle technology, HEVs have the potential to reduce the use of petroleum-based fuels and vehicle emissions. As these technologies are advancing, the Field Operations Program is developing projects to evaluate HEVs. An important aspect of developing appropriate projects is assessing the types of information that potential advanced vehicle users require to make informed decisions about vehicle purchases and fleet implementation.

The HEV Information Needs Study project was designed to characterize the types of information needed by potential HEV customers. The objective was to understand the information needs of potential advanced vehicle customers so test and evaluation projects can be developed, and so the resulting information products can be designed to address these needs.

The survey results indicate that many fleets have past experience with AFVs, have some knowledge of HEVs, and rely on trade and association publications as a primary source of advanced technology information. This report provides more details related to these and other major findings of the HEV Information Needs Survey. The report discusses the approach and methodology used in the survey and data analysis, then presents characteristics of the respondents and the fleets they represent. This is followed by the major survey results and findings and three appendices, which contain more detailed data.

Study Methodology and Approach

The project approach was to interview 200 to 300 fleet managers or personnel involved in vehicle purchase decisions, to summarize the results, and to provide an assessment of the need for various types of vehicle information and publications. We sought feedback from fleets operating vehicles across the spectrum of light-duty, medium-duty, and heavy-duty vehicles.

We designed the survey questionnaire to gather information characterizing each organizations' fleet make-up, its experience with AFVs, its knowledge and interest in HEVs, and its needs relative to advanced technologies and HEV information and information sources. (This questionnaire is included in Appendix A of this report.) DOE Field Operations Program managers, along with the Field Operations Program coordinator at Idaho National Engineering and Environmental Laboratory, reviewed the questionnaire. In addition, we conducted a test run of the survey questionnaire with two pre-selected fleet operators. The test run verified the "answerability" and relevance of each question. We made appropriate modifications following an analysis of these calls.

We developed a list of interview contacts to complete the series of interviews. The contact list included a geographically diverse population of fleet managers and potential HEV customers from 11 specific fleet categories, including both public- and private-sector fleets.

Nearly all the surveys were completed via telephone interviews. In a few instances, at the request of respondents, faxed responses to the survey were returned with follow-up contact by telephone as needed. We established a goal for the number of surveys to be completed in each fleet category. As the interviews progressed, these goals were revised for some categories because of difficulties in finding people willing to participate. The numbers of surveys completed in each fleet category is summarized in Table 1. Under subcontract to the National Renewable Energy Laboratory (NREL), RP Publishing, Inc., completed the interviews, tabulated the data, and completed an initial analysis and summary of the data.

Table 1. Number of Interviews Completed by Fleet Category

Fleet Type	Number Interviewed	Percent of Total
City Fleet	28	11.5
Delivery	45	18.4
Federal Gov't Fleet	26	10.6
Military Fleet	11	4.5
School Buses	20	8.2
Shuttle Service	11	4.5
State Fleet	26	10.7
Taxicab	15	6.1
Transit	22	9.0
USPS	10	4.1
Utility Fleets	30	12.3
Total	244	100

We analyzed the data using cross-tabulations and contingency tables, subdivided into appropriate groupings. In presenting the results, we used descriptive statistics—generally percentages. Principal groupings involved subdivision by public or private fleet, and by specific fleet types.

In this analysis, the public fleet group included responses from federal, state and city government fleets, military fleets, school bus fleets, transit systems, and the postal service. The private fleet group included responses from delivery fleets, shuttle services, taxicabs, and utility fleets. The "delivery" category included all types of delivery vehicles, including grocery fleets, Federal Express, and United Parcel Service (UPS). The "federal government" category includes specifically targeted fleets such as the General Services Administration (GSA), and national park fleets, but specifically excludes military fleets and the postal service. The "utility" category includes mostly electric and natural gas companies, but also includes a few telephone and cable service providers.

Respondent and Fleet Characteristics

Interviews were completed with a variety of fleet and vehicle applications representing the potential pool of HEV users. This section summarizes the characteristics of the fleets that responded, such as type, location, fleet size, annual vehicle purchases, and factors considered in vehicle purchases. In all, 244 interviews were completed—143 with public fleets and 101 with private fleets. In addition, we attempted to be geographically diverse in the survey coverage, and to represent the various classes of vehicles in use. The geographic distribution of the completed interviews is summarized in Table 2 and shown graphically by public and private fleets in Figure 1.

Table 2. Census Region Distribution of Respondents by Fleet Type

Fleet Type	Northeast		Midwest		South		West		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
City Fleet	1	3.6	4	14.3	7	25.0	16	57.1	28	100
Delivery	9	20.0	11	24.4	13	28.9	12	26.7	45	100
Federal Gov't Fleet	1	3.8	2	7.7	7	26.9	16	61.5	26	100
Military Fleet	0	0.0	1	9.1	5	45.5	5	45.5	11	100
School Buses	2	10.0	3	15.0	6	30.0	9	45.0	20	100
Shuttle Service	2	18.2	3	27.3	2	18.2	4	36.4	11	100
State Fleet	3	11.5	6	23.1	5	19.2	12	46.2	26	100
Taxicab	3	20.0	5	33.3	3	20.0	4	26.7	15	100
Transit	2	9.1	3	13.6	7	31.8	10	45.5	22	100
USPS	2	20.0	1	10.0	6	60.0	1	10.0	10	100
Utility Fleet	5	16.7	4	13.3	13	43.3	8	26.7	30	100
Private	19	18.8	23	22.8	31	30.7	28	27.7	101	100
Public	11	7.7	20	14.0	43	30.1	69	48.3	143	100
Total	30	12.3	43	17.6	74	30.3	97	39.8	244	100

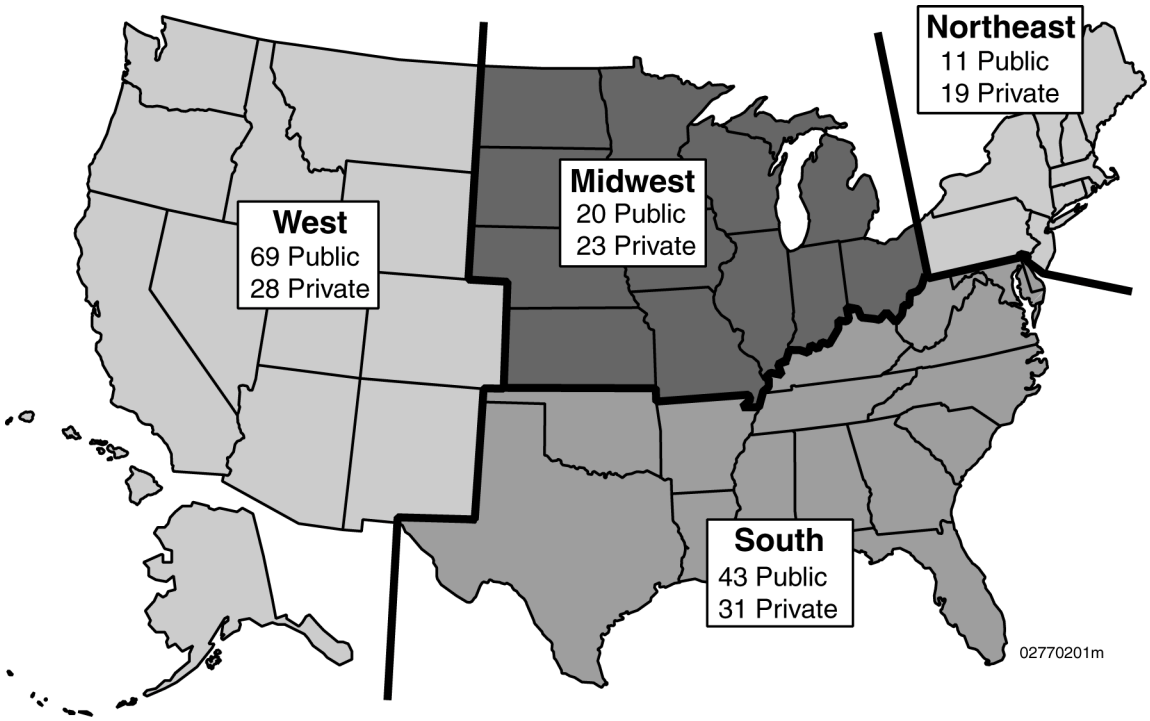


Figure 1. Geographic distribution of respondents from public and private fleets by region

The respondents' fleets represent a variety of different vehicle applications. Figure 2 summarizes the vehicle applications. The highest percentage of applications is passenger/ shuttle services, followed by utility vehicles (meaning used in various applications, not necessarily by a utility company), and other applications. Multiple responses were received from fleets that use vehicles in more than one application. Respondents indicating "other" were asked to be more specific, and the responses included public transit, municipal government, public safety, sales, and mail delivery. Appendix B contains a table showing the breakdown of fleet vehicle applications by fleet type.

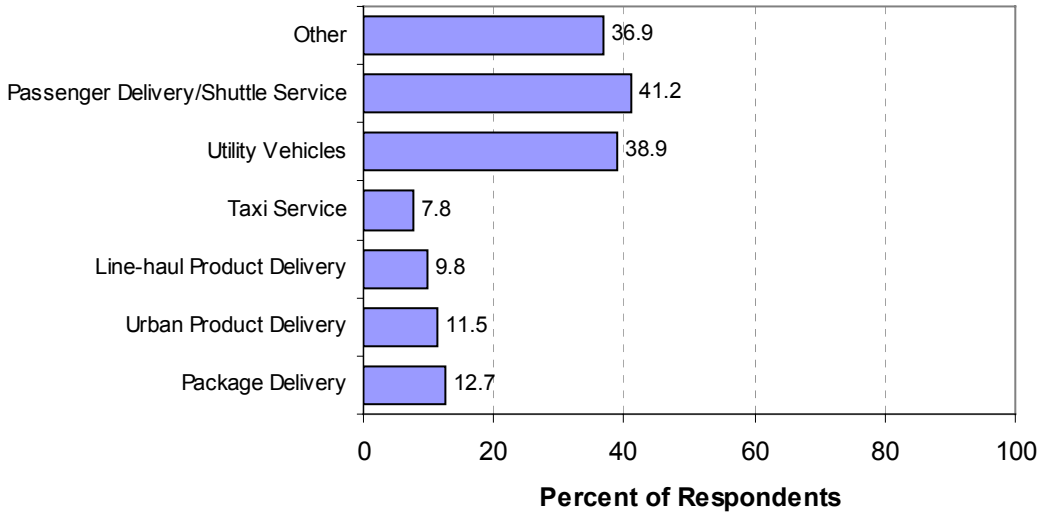


Figure 2. Vehicle applications that best describe each respondent's fleet

The mix of fleet sizes ranged from small fleets of 50 vehicles or less to large fleets with more than 1,000 vehicles. Figure 3 shows the distribution of fleet sizes for all responses and for responses grouped by public and private fleet. Overall, fleets with more than 1000 vehicles were the most common among the respondents (nearly 40%). This was also the most common response when grouped by private and public fleets. Detailed distributions by fleet type are available in Appendix B. The survey tends to represent larger fleets, but, on the whole, provides feedback from a varied fleet experience base.

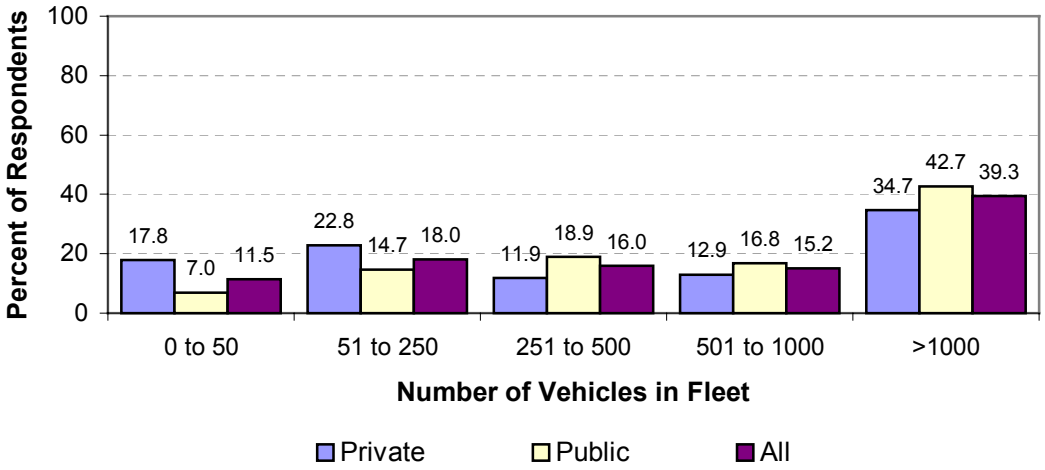


Figure 3. Range of fleet sizes for all responses and for responses grouped as public or private fleets

Respondents were asked about the typical service of their fleet vehicles—intra-city, inter-city, or interstate. Inter-city (meaning between cities within a state or region) was the most common response, reported by 44% of the respondents (see Figure 4). Among public fleets, inter-city, at 43%, was followed by intra-city at 35.2%. For private fleets, 45.5% reported inter-city as their most common service, followed by 43.4% who indicated that all three occur in their fleet. Less than 3% of respondents listed interstate as typical service of their fleet. Distribution of typical service by fleet type is provided in Appendix B.

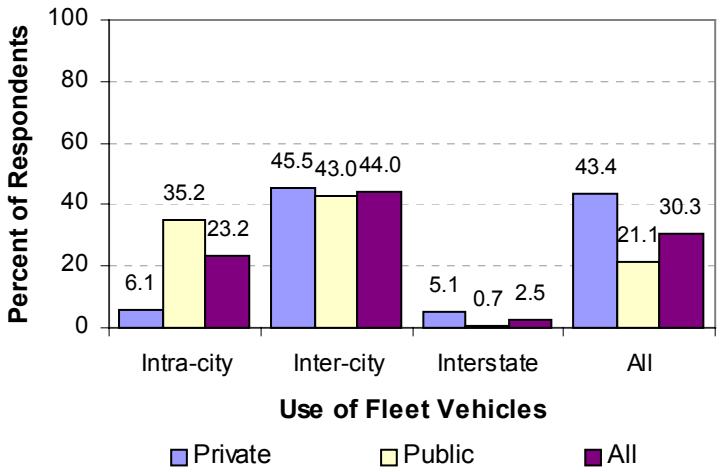


Figure 4. Distribution of typical fleet vehicle service: all fleets, public fleets, and private fleets

We asked respondents about vehicle service life—based on mileage and time—for different vehicle classes. Table 3 summarizes the results. Because they operate vehicles in multiple vehicle classes, many respondents provided multiple responses about service life. Of note is that service life, in terms of both accumulated miles and years in service, increased with vehicle class from light-duty vehicles to heavy-duty vehicles. Clearly, fleets tend to operate heavy-duty vehicles longer than their light-duty vehicles. Private fleets tended to have longer service life in terms of vehicle mileage, but less time in service years than public fleets. Additional details by fleet type are tabulated in Appendix B.

Table 3. Vehicle Service Life in Miles and Years for Each Vehicle Class*

Accumulated Mileage	**up to 50K mi**		**50K to 100K mi**		**100K to 300K mi**		**300K to 500K mi**	
Vehicle Class	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
Light-Duty	17	9.1	96	**51.3**	61	32.6	13	7.0
Medium-Duty	12	9.5	68	**53.5**	44	34.7	3	2.4
Light Heavy-Duty	11	9.6	45	39.1	48	**41.7**	9	7.8
Heavy-Duty	15	12.0	27	21.6	41	32.8	42	**33.6**
Years in Service	**3 yr or less**		**3 to 7 yr**		**7 to 10 yr**		**more than 10 yr**	
Vehicle Class	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
Light-Duty	26	12.4	105	**50.2**	51	24.4	27	12.9
Medium-Duty	6	3.6	66	**39.8**	65	39.2	29	17.5
Light Heavy-Duty	3	2.1	28	20.0	62	**44.3**	47	33.6
Heavy-Duty	2	1.2	22	13.4	51	31.1	89	**54.3**

* "bold" values indicate highest percentage responses in each vehicle class

Respondents were then asked to provide feedback related to purchasing new vehicles. Responses about the number of vehicles purchased per year ranged from less than 10 to more than 500, with the highest percentage of responses falling in the range of 11 to 50 vehicles (32.6%). The next most common range was 101 to 500 vehicles (23%) purchased per year.

Respondents were then asked to identify the top three factors in making vehicle purchase decisions. The responses were grouped into the categories listed in Table 4. The top factors were cost (32.1%), availability/suitability (29.9%), reliability/durability (16.2%) and performance (~10%). All other factors were reported by less than 10% of the respondents.

Table 4. Summary of Most Common Factors Considered When Purchasing Vehicles

	All Responses		Public Fleets		Private Fleets	
Factor	%	Count	%	Count	%	Count
Cost	32.1	174	30.3	92	34.5	82
Availability/Suitability	29.9	162	31.6	96	27.7	66
Reliability/Durability	16.2	88	15.1	46	17.6	42
Performance	9.9	54	9.9	30	10.1	24
Maintenance/Service	5.7	31	4.9	15	6.7	16
Infrastructure/Fuel	2.6	14	3.0	9	2.1	5
Regulatory/Compliance	1.7	9	3.0	9		
Safety	1.7	9	2.0	6	1.3	3
Training	0.2	1	0.3	1		

Summary of Major Findings

The HEV Information Needs survey reveals a number of decision-making factors fleet operators consider when evaluating advanced technology vehicles. This section summarizes results from queries related to respondents' experiences with AFVs, their information needs related to HEVs and other advanced technology vehicles, and their preferred information sources. Most of the graphs and tabulations summarize all responses, and responses by public or private fleet type.

Experience with AFVs

Just over half the respondents (52.5%) indicated that they are required to include AFVs or Low Emissions Vehicles (LEVs) in their vehicle purchases. As depicted in Figure 5, nearly 30% more public fleet than private fleet respondents (64.3% compared to 35.6%) indicated that they are under a regulation or directive to add AFVs or LEVs to their fleets. Approximately 32% of respondents identified the Energy Policy Act (EPAct) and 30% indicated the Clean Air Act (CAA) as legislation requiring them to use AFVs or LEVs. A number of respondents could not identify specific legislation, but indicated the requirement as a federal, state, or local regulation.

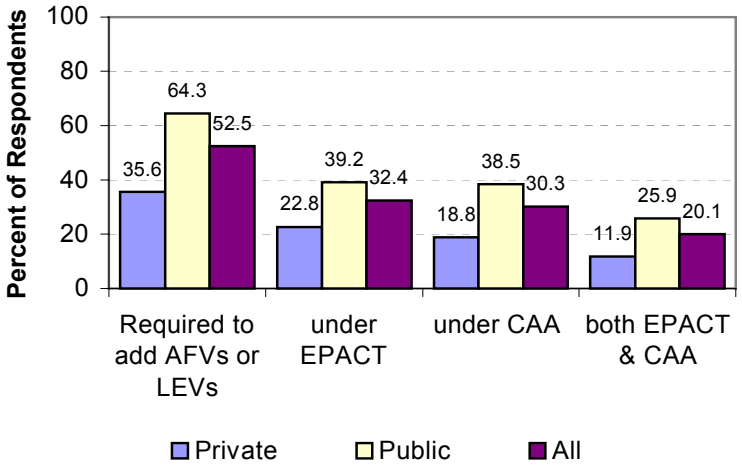


Figure 5. Respondents indicating requirement to purchase AFVs and LEVs

Although not necessarily required to use AFVs, nearly 74% of respondents indicated some experience with operating AFVs. Among these respondents, 77% indicated experience with CNG-fueled AFVs, nearly 32% had experience with LPG AFVs, 20.6% had experience with electric AFVs, and 31% had experience with alcohol-fueled AFVs. Nearly 39% of the respondents had experience with more than one type of AFV. Not surprisingly, a higher percentage of public fleets (86.7%) than private fleets (55.5%) indicated experience with AFVs. Among respondents, those from government fleets (see Table 5) were the most likely to have experience operating AFVs.

Table 5. Respondents Indicating Experience Operating AFVs in Their Fleets

Fleet Type	Have Experience with AFVs		
	Count	Total respondents	%
All	**180**	**242**	**73.8**
Private	56	99	55.5
Public	124	143	86.7
City Fleet	27	28	96.4
Delivery	18	43	40.0
Federal Gov't Fleet	22	26	84.6
Military Fleet	10	11	90.9
School Buses	9	20	45.0
Shuttle Service	8	11	72.7
State Fleet	25	26	96.2
Taxicab	4	15	26.7
Transit	21	22	95.5
USPS	10	10	100.0
Utility Fleet	26	30	86.7

The respondents whose fleets had operated AFVs were asked to rate their overall experience. About 53% reported their AFV experience as very favorable or favorable, 24% rated their experience as neutral, and nearly 23% rated their AFV experience as negative or very negative. Ratings of AFV experience are given by fleet type in Appendix C.

Although most of the respondents have had good or neutral experiences with AFVs, 23% have not, which raises the question of the issues associated with use or implementation of AFVs in a fleet. We questioned respondents about issues and barriers to the use of AFVs. Figure 6 summarizes the responses. Many respondents cited more than one issue or barrier, and a few respondents did not answer this question at all. Issues grouped as "Infrastructure," including lack of fueling infrastructure and cost of fuel infrastructure, were the most commonly reported barriers or issues to AFVs use (40.8%). This was followed by cost (17.9%), which included vehicle costs and operating and maintenance cost, range (14.3%), vehicle

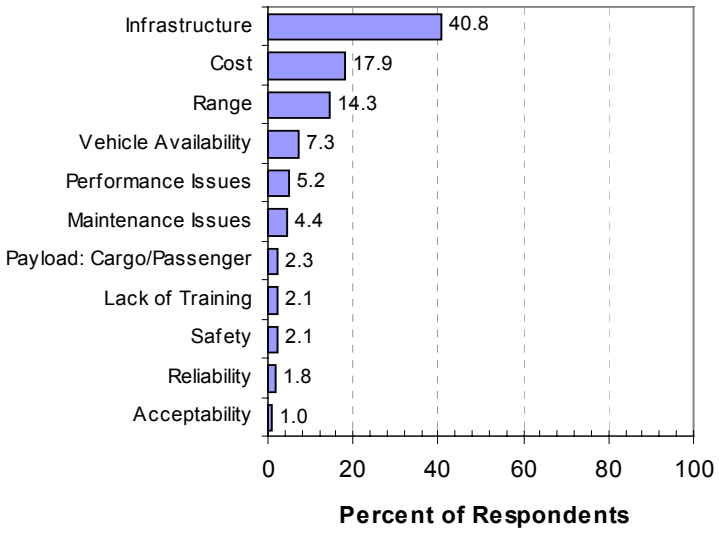


Figure 6. Most commonly reported barriers and issues with use of AFVs

availability (7.0%), and performance issues (5.2%), which included all performance issues besides range. These issues and barriers are likely to be areas of interest or concern as fleets and vehicle operators look at advanced technology vehicles.

HEV and Advanced Technology Vehicle Information Needs

Prior to asking questions about specific information needs, we asked a number of general questions related to HEVs and advanced technology vehicles. We asked whether each of the following was a reason to implement advanced technology vehicles: economics, environmental issues, corporate image, regulatory compliance, or all of these. Figure 7 summarizes the positive responses, grouped by public or private fleet. Environmental and regulatory compliance were the most common reasons cited for considering implementing new technology vehicles. It is worthwhile noting that most respondents who replied "yes" to economics as a reason further clarified their answer as meaning that economics generally keep them from acquiring advanced technology vehicles. The distribution of reasons for implementing advanced technology vehicles is provided by specific fleet type in tabular form in Appendix C.

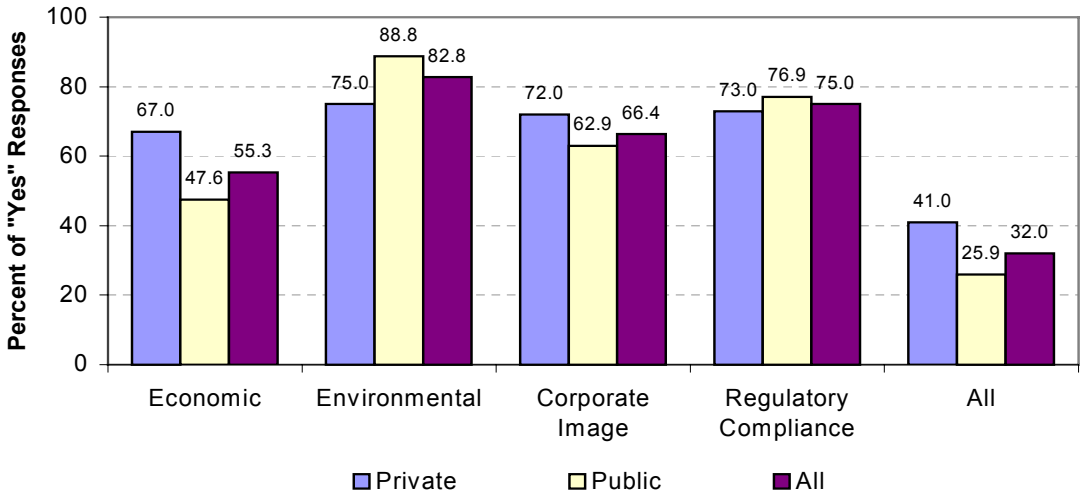


Figure 7. Summary of positive responses related to reasons to implement advanced technology vehicles

Overall, more than 78% of the respondents indicated that they know something about HEVs (see Table 7). A higher percentage of public fleet respondents (84.6%) reported being familiar with HEVs, compared to 69% of private fleets. Only the shuttle service category had more than 50% of respondents indicate that they are not familiar with HEVs. A smaller percentage of all respondents (62.7%) believes there are specific applications that HEVs can meet in their fleets (see Figure 8). More public fleet respondents (74.8%) indicated that HEVs could fulfill a vehicle need in their fleets, compared to 45.5% among the private fleet respondents. A fair number of respondents (23.8% overall) do not know if HEVs can meet any of their fleet needs.

Table 7. Summary of Respondents Who Said They Know Something about HEVs

Fleet Type	Familiar with HEVs	
	Count	%
All	**190**	**78.2**
Private	69	69.0
Public	121	84.6
City Fleet	25	89.3
Delivery	29	65.9
Federal Gov't Fleet	19	73.1
Military Fleet	10	90.9
School Buses	17	85.0
Shuttle Service	4	36.4
State Fleet	21	80.8
Taxicab	11	73.3
Transit	21	95.5
USPS	8	80.0
Utility Fleet	25	83.3

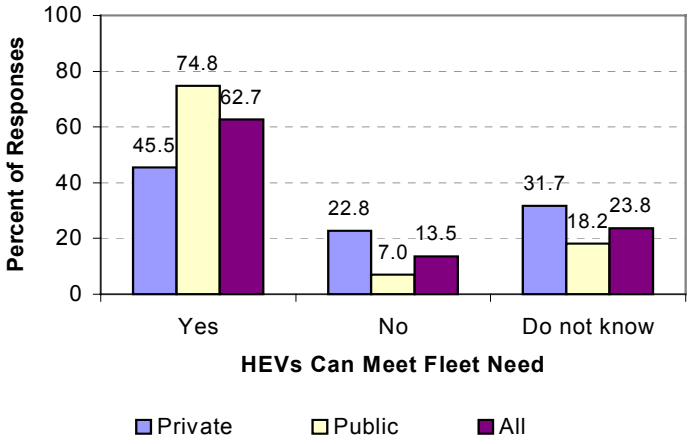


Figure 8. Summary of responses to whether HEVs can meet specific fleet applications

In a previous section, we discussed factors considered in fleet vehicle purchases. We learned that cost, vehicle reliability/durability, and vehicle availability/suitability were among the top factors that fleets consider (see Table 4). Respondents were asked if these factors would change when considering the purchase of an advanced technology vehicle. The majority (63.5%) indicated these factors would not change. Table 8 presents the *different* factors reported by the 36.5% of respondents indicating purchase decision factors *would* change. Cost was still the most often-cited factor, but other factors such as environmental compliance, infrastructure/fueling, and vehicle range moved up in importance. These questions were open-ended, prompting the respondents to reply in their own words. The answers were then grouped together in categories.

Table 8. Different Factors Reported when Considering Advanced Technology Vehicle Purchases

Factor	%	Count
Cost	27.1	26
Environmental Compliance/Regulatory	16.7	16
Availability/Suitability	11.5	11
Infrastructure/Fueling	10.4	10
Range	10.4	10
Reliability/Durability	9.4	9
Maintenance/Service	8.3	8
Performance	6.3	6

The respondents were then asked to identify up to three specific performance or functional attributes that HEVs must have to meet their fleet needs. These results are summarized in Table 9. There was no difference in the type of attributes or the frequency of their reports among public and private fleet respondents. The most important attribute was the range of the vehicle, followed by vehicle reliability/durability and vehicle performance. It is not clear whether range is truly an operational issue for many of these fleets, or whether past experience with AFVs (particularly with natural gas and electric vehicles, which have had range issues) puts range in the forefront for many of these respondents. Because HEVs are not expected to have the same range limitations of some current AFVs, this may

indicate that there is a need for more general information on how HEVs compare to conventional vehicles and currently available AFVs.

Table 9. Specific Performance or Functional Attributes HEVs Must Have to Meet Fleet Needs

Desired Attribute	Number of Reports	
	%	Count
Range	24.4	152
Reliability/Durability	17.3	108
Performance	16.2	101
Availability/Reliability	14.9	93
Reasonable Cost	11.2	70
Maintenance/Service	5.6	35
Infrastructure/Fuel	3.7	23
Better for Environment	2.7	17
Safety	2.7	17
Passenger Comfort	1.1	7

We asked respondents to rate a number of specific categories of information in terms of how helpful it would be in making HEV purchase decisions. The ratings included critical, important, neutral, not very important, and do not need this information. In trying to assess the HEV information needs, categories ranked as critical or important are of most interest. Table 10 summarizes these rankings.

Table 10. Information Categories Rated "Critical" or "Important" to Making HEV Purchase Decisions

Information Category	%	Count
Reliability/Durability	90.9	222
Driving Range	87.3	213
Operating Costs	86.8	211
Vehicle Specifications	83.1	202
Vehicle Cost	82.8	202
Fueling Infrastructure	82.4	201
Maintenance Differences	79.1	193
Equipment	77.0	188
Dealership Service	76.6	187
Technician Training	74.6	182
Emissions	73.8	180
Fuel Economy	73.8	180
Vehicle/Model Availability	72.1	176
Fleet Incentives	65.2	159
Contacts/Sources of Add'l Information	60.2	147
Acceleration	58.6	143
Case Studies	48.8	119

At least 50% of the respondents rated all information categories, with the exception of case studies, as critical or important to making HEV purchase decisions. Based on the response rates, it appears that respondents may not understand that case studies typically include much of the information considered critical or important. The top five information categories, each receiving a critical or important rating from at least 80% of the respondents, were performance- or cost-related. They included reliability/ durability, driving range, operating costs, vehicle specifications, and vehicle cost. The next highest category, reported by more than 80% of respondents, was fueling infrastructure. Clearly, there is a strong need for vehicle performance and cost information, but there is also a need for information on special support, which includes information on maintenance differences, special equipment needs, dealership service, and technician training.

The information needs rated critical and important by public and private fleets are summarized in Table 11. The order of the information categories is similar, with the top three—reliability/ durability, driving range, and operating costs—in the same order as the overall results. Note that for nearly all categories, more public fleet respondents indicated that information needs were critical or important. The biggest difference was in the need for emissions information, with nearly 25% more public than private fleet respondents indicating that this is a critical or important need. Additional graphical and tabular summaries by information category type and specific fleet are provided in Appendix C.

Table 11. Information Categories Ranked "Critical" or "Important" by Public and Private Fleet Respondents

Information Category	Private Fleets		Information Category	Public Fleets	
	%	Count		%	Count
Reliability/Durability	88.1	89	Reliability/Durability	93.0	133
Driving Range	85.2	86	Driving Range	88.8	127
Operating Costs	84.2	85	Operating Costs	88.7	126
Fueling Infrastructure	81.2	82	Vehicle Specifications	85.2	121
Vehicle Cost	81.2	82	Maintenance Differences	84.6	121
Vehicle Specifications	80.2	81	Emissions	83.9	120
Fuel Economy	76.2	77	Vehicle Cost	83.9	120
Equipment	75.2	76	Fueling Infrastructure	83.2	119
Maintenance Differences	74.3	75	Dealership Service	83.2	119
Vehicle Model/Availability	72.3	73	Training	79.6	113
Training	68.3	69	Equipment	78.3	112
Dealership Service	67.3	68	Fuel Economy	72.0	103
Fleet Incentives	63.4	64	Vehicle Model/Availability	72.0	103
Emissions	59.4	60	Fleet Incentives	66.4	95
Contact/Sources for Add'l Information	57.4	58	Acceleration	62.2	89
Acceleration	53.5	54	Contact/Sources for Add'l Information	62.2	89
Case Studies	45.5	46	Case Studies	51.1	73

Information Source Preferences

We asked respondents about their primary sources of information on advanced technology vehicles and trends. The potential information sources included vehicle manufacturers, the federal government, trade publications, and local stakeholders groups. Respondents could provide positive responses to any or all sources and could also indicate "other" sources. Figure 9 shows the results.

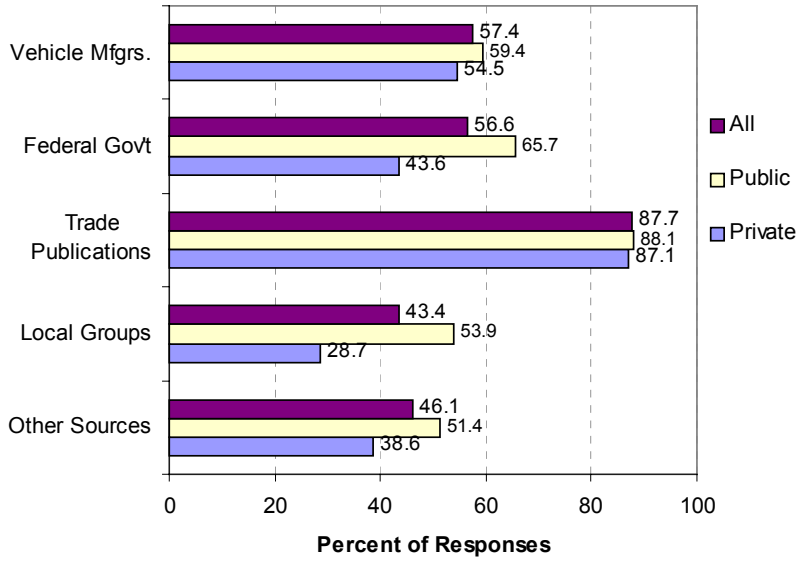


Figure 9. Primary sources of information on advanced technology vehicles/trends

Nearly 88% of the respondents indicated that trade publications are their primary source of information on advanced technology vehicles and trends. More than 50% of the respondents also indicated vehicle manufacturers and the federal government as sources of this type of information. Public fleets were more likely than private fleets to get information from the federal government. More than 40% of respondents indicated they rely on some "other" source for advanced vehicle information. The "other" sources reported included the Web/Internet, professional associations, conferences/seminars/meetings, newspapers, and advocacy groups (like the NGVC). More than 5% of respondents specifically identified the Clean Cities Program as an information source. Appendix C contains a summary of responses by specific fleet type.

Finally, respondents were asked about their preferred method for receiving information on advanced technology vehicles and trends. The categories included industry conferences, industry publications, government publications, electronic newsletters, Web/Internet, alternative fuels and other hotlines, and direct mail. Respondents could again say yes to each category and could provide "other" preferred sources. The results are summarized in Figure 10.

Nearly 90% of the respondents said they prefer to get advanced technology vehicle information from industry publications, which includes vehicle manufacturers, trade organizations, and fleet organizations. Other preferred methods include the Web/Internet (73.4%), government publications (71.7%), and direct mail (67.5%). Percentages of 50% or more were reported for each media, except hotlines (40%). This suggests that no one type of information source is used exclusively, and fleet operators are likely to explore a number of sources for information on HEVs. A summary by specific fleet type can found in Appendix C.

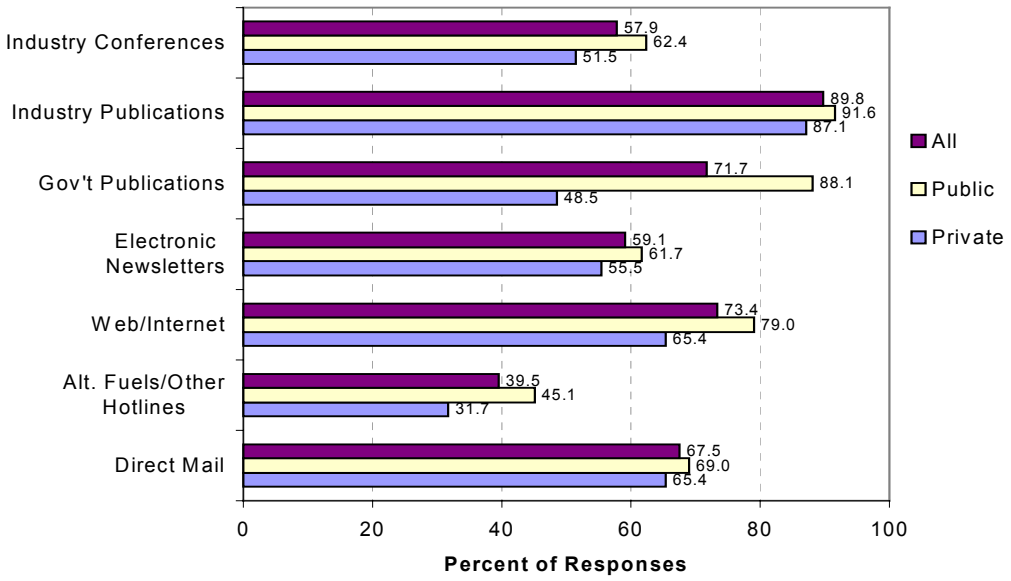


Figure 10. Preferred way to receive information on advanced technology vehicles/trends

Appendix A
HEV Information Needs Study—Questionnaire

HEV Information Needs Study—Questionnaire

Contact Name:
Company/Organization:
Division:
Address:
Phone:
Fax:
E-mail:

Introduction
Hi, my name is _____with RP Publishing. I'm contacting you as part of a project for the Department of Energy and the National Renewable Energy Laboratory. Would you have about twenty minutes to answer a few questions regarding alternative fuel vehicles, specifically hybrid-electric vehicles? (If yes, proceed. If No, schedule a time to call back or ask for an appropriate contact within the organization.)

Thank you, I appreciate your willingness to participate. My questions cover three key areas. I will be asking you several general questions about your organization's fleet, several questions about alternative fuel vehicles and your organization's experience with them, and then we will ask you about hybrid-electric vehicles. May I go ahead and ask the first question?

Introduction Filler
The information we gather from you and a number of other fleets will help determine what kind of information potential hybrid-electric customers' need. It will also assist DOE in planning programs to evaluate the viability of HEVs. Your input will be very helpful.

Fleet Characteristics

Please list cities where your fleet operates [state(s), region(s), or nationwide]:

1. What is the total Number of Vehicles in the Fleet?

2. Using the following vehicle classifications (list those below). Approximately, what would you say the percentage of your fleet is:
    a. Light duty vehicles (<8500 gvwr)?
    b. Medium duty vehicles (8500 – 14,000 gvwr)?
    c. Light Heavy duty vehicles (14,000 – 26,000 gvwr)?
    d. Heavy duty vehicles (>26,000 gvwr)?

3. Approximately, what percentage of your fleet is:
    a. Cars/vans/SUVs
    b. Pickup trucks
    c. Line-haul trucks/tractor trailer trucks
    d. Transit Buses
    e. Other trucks

4. Which of the following applications best describe your fleet:
    a. Package delivery vehicles
    b. Urban product delivery
    c. Line-haul product delivery

d. Taxi service
e. Utility vehicles (vans/pickups)
f. Passenger delivery / shuttle service
g. Other (please specify)

5. Which best describes how your fleet vehicles are operated?
   a. Intra-city;
   b. Inter-city;
   c. Interstate;
   d. Other (as on a campus or military base; please specify)
   e. All of the above

6. Approximately how many vehicles would you say you purchase per year?

7. What are the top three factors you consider when making vehicle purchase decisions?

8. Using the same vehicle classifications we listed in question 2 (repeat them), what is the typical service life of your fleet vehicles?

   a. Light duty (<8500 gvwr)?
      Miles Years
   b. Medium duty (8500 – 14,000 gvwr)?
      Miles Years
   c. Light Heavy duty (14,000 – 26,000 gvwr)?
      Miles Years
   d. Heavy duty (>26,000 gvwr)?
      Miles Years

9. Is your fleet being required to purchase alternative fuel vehicles (AFVs) or low-emission vehicles (LEVs) under the Energy Policy Act (EPACT), the Clean Air Act or some similar Federal, State or Local program?
   a. If yes, please name the program(s)

10. Does your fleet operate in a metropolitan area involved in any of the following programs (please specify which ones):
   a. Clean Cities
   b. Clean Fuel Fleet Program
   c. Non-attainment area for National Ambient Air Quality Standards
   d. CMAQ (Congestion Mitigation and Air Quality Improvement Program)
   e. None
   f. Other

11. Have you in the past, or do you currently operate any alternative fuel vehicles?
   If yes:
      a. How many?
      b. What types/fuels?
      c. What applications?
      d. Daily operations? or trial basis?

12. *(If operate/operated alternative fuel vehicles)* How would you describe your fleet's overall experiences with alternative fuel vehicles?

a. very favorable
b. favorable
c. neutral
d. negative
e. very negative

Comments/reasons for the above response:

13. Could you comment on what you see as the greatest barriers or issues associated with the implementation and use of alternative fuel vehicles in your fleet?

Now we would like to ask you a few questions about advanced technology vehicles such as Fuel cell and Hybrid electric vehicles.

14. What may be your reasons for implementing advanced technology vehicles into your fleet? Are they...

a. Economic?
b. Environmental?
c. Corporate image?
d. Regulatory compliance? (please specify)
e. Other? (please specify)
f. All of the above

15. Earlier in the interview I asked about the factors involved in your purchase of a traditional vehicle. Would these factors be different when considering the purchase of an advanced technology vehicle?

If yes, what are the different factors involved?

16. Are you familiar with hybrid electric vehicles?

17. Do you expect to be operating some form of hybrid electric vehicles in your fleet within the next 5 or 10 years?

a. 5 years or less
b. 5 to 10 years,
c. Ever,
d. Do not know

18. Are there specific applications in your fleet that you think hybrid electric vehicles could fulfill?

a. Yes,
b. No,
c. Don't know enough about hybrid electric vehicles

If yes, describe likely applications for hybrid electric vehicles in your fleet:

19. What three specific performance or functional attributes must hybrid electric vehicles have to meet the needs of your fleet?

20. Could you rank the following questions in terms of what category of information is most helpful to you when purchasing a hybrid electric vehicle? *1. critical, 2. important, 3. neutral, 4. not very important, 5. don't need this info*

a. Vehicle/model availability
b. Vehicle specifications
c. Price
    i. Vehicle Cost
    ii. Fleet Incentives (Federal/State/Local)
d. Operating Costs (Maintenance, Refueling)
e. Case Studies from other fleets using hybrid electric vehicles
f. Performance Ratings, such as
    i. Fuel Economy
    ii. Driving Range
    iii. Acceleration
    iv. Emissions
    v. Reliability/ Durability
g. Information on Fueling Infrastructure Stations
h. Information on Special Support Needs, such as
    i. Equipment
    ii. Technician Training
    iii. Dealership Service
    iv. Additional/ Different Scheduled Maintenance
        (such as battery life / charging needs, etc)
i. Industry Contacts and Sources of Additional hybrid electric vehicles Information

Is there any other information that you would find useful that we did not already mention?

21. Which of the following categories are your primary sources of information on advanced vehicle technologies/trends in transportation and related areas? (answer yes or no to each)

Automotive Manufacturers?
Information Published by Federal Government (DOE, DOT, etc)?
Industry Trade Publications? – specify which one(s)
Information Provided by Local Stakeholder Group? – specify which one(s)
Other sources? specify which one(s)

22. Which of the following categories do you prefer to receive information on advanced transportation technologies/trends in transportation and related areas? (answer yes or no to each)

Industry Conferences?
Industry Publications?
Government Publications?
Electronic Newsletters?
World Wide Web / Internet?
Alternative Fuels/Other Phone-Based Hotlines?
Direct Mail?
Other? (please specify)

That completes the interview. I want to thank you for your time and comments.

Appendix B
Additional Respondents and Fleet Characteristics

Table B-1. Fleet Vehicle Applications by Specific Fleet Type

Fleet Type	Package Delivery		Urban Product Delivery		Line-Haul Delivery		Taxi Service		Utility vehicles		Passenger/Shuttle Service		Other	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
All	31	12.7	28	11.5	24	9.8	19	7.8	95	38.9	98	41.2	90	36.9
Private	15	14.8	23	22.8	13	12.9	15	14.8	35	34.6	20	19.8	21	20.8
Public	16	11.2	5	3.5	11	7.7	4	2.8	60	41.9	78	54.6	69	48.2
City Fleet	1	3.6	0	0.0	0	0.0	0	0.0	20	71.4	8	28.6	10	35.7
Delivery	14	31.1	22	48.9	11	24.4	0	0.0	6	13.3	4	8.9	15	33.3
Federal Gov't Fleet	3	11.5	1	3.8	3	11.5	2	7.7	14	53.8	16	61.5	16	61.5
Military Fleet	3	27.3	0	0.0	2	18.2	1	9.1	7	63.6	6	54.6	5	45.6
School Buses	0	0.0	0	0.0	0	0.0	0	0.0	3	15.0	17	85.0	2	10.0
Shuttle Service	0	0.0	1	9.1	1	9.1	1	9.1	0	0.0	11	100.0	0	0.0
State Fleet	4	15.4	2	7.7	4	15.4	1	3.8	15	57.7	13	50.0	21	80.8
Taxicab	1	6.7	0	0.0	0	0.0	14	93.3	0	0.0	4	26.7	0	0.0
Transit	0	0.0	1	4.6	1	4.6	0	0.0	1	4.6	18	81.8	10	45.6
USPS	5	50.0	1	10.0	1	10.0	0	0.0	0	0.0	0	0.0	5	50.0
Utility Fleet	0	0.0	0	0.0	1	3.3	0	0.0	29	96.7	1	3.3	6	20.0

Table B-2. Distribution of Fleet Size by Specific Fleet Type

Fleet Type	0 to 50 vehicles		51 to 250 vehicles		251 to 500 vehicles		501 to 1000 vehicles		more than 1000 vehicles	
	Count	%	Count	%	Count	%	Count	%	Count	%
All	28	11.5	44	18.0	39	16.0	37	15.2	96	39.3
Private	18	17.8	23	22.8	12	11.9	13	12.9	35	34.7
Public	10	7.0	21	14.7	27	18.9	24	16.8	61	42.7
City Fleet	0	0.0	2	7.1	5	17.9	9	32.1	12	42.9
Delivery	4	8.9	12	26.7	6	13.3	6	13.3	17	37.8
Federal Gov't Fleet	6	23.1	4	15.4	5	19.2	0	0.0	11	42.3
Military Fleet	0	0.0	2	18.2	1	9.1	2	18.2	6	54.6
School Buses	1	5.0	4	20.0	8	40.0	3	15.0	4	20.0
Shuttle Service	4	36.4	5	45.5	1	9.1	1	9.1	0	0.0
State Fleet	1	3.9	2	7.7	4	15.4	4	15.4	15	57.7
Taxicab	9	60.0	3	20.0	1	6.7	1	6.7	1	6.7
Transit	2	9.1	7	31.8	3	13.6	6	27.3	4	18.2
USPS	0	0.0	0	0.0	1	10.0	0	0.0	9	90.0
Utility Fleet	1	3.3	3	10.0	4	13.3	5	16.7	17	56.7

Table B-3. Distribution of Typical Fleet Vehicle Service by Specific Fleet Type

Fleet Type	Intra-city		Inter-city		Interstate		All	
	Count	%	Count	%	Count	%	Count	%
All	56	23.2	106	44.0	6	2.5	73	30.3
Private	6	6.1	45	45.5	5	5.1	43	43.4
Public	50	35.2	61	43.0	1	0.7	30	21.1
City Fleet	13	46.4	12	42.9	0	0.0	3	10.7
Delivery	3	6.7	12	26.7	2	4.4	28	62.2
Federal Gov't Fleet	6	24.0	8	32.0	1	4.0	10	40.0
Military Fleet	5	45.5	2	18.2	0	0.0	4	36.4
School Buses	11	55.0	9	45.0	0	0.0	0	0.0
Shuttle Service	0	0.0	7	63.6	1	9.1	3	27.3
State Fleet	5	19.2	12	46.2	0	0.0	9	34.6
Taxicab	1	6.7	11	73.3	1	6.7	2	13.3
Transit	9	40.9	12	54.6	0	0.0	1	4.6
USPS	1	10.0	6	60.0	0	0.0	3	30.0
Utility Fleet	2	7.1	15	53.6	1	3.6	10	35.7

Table B-4a. Typical Fleet Vehicle Service Life in Miles—Light-Duty Vehicles

Fleet Type	up to 50,000 mi.		50,000 to 100,000 mi.		100,000 to 300,000 mi.		300,000 to 500,000 mi.	
	Count	%	Count	%	Count	%	Count	%
All	17	9.1	96	51.3	61	32.6	13	7.0
Private	3	3.9	34	35.4	29	37.7	11	14.3
Public	14	12.7	62	56.4	32	29.1	2	1.8
City Fleet	3	12.0	15	60.0	7	27.0	0	0.0
Delivery	1	3.2	18	58.1	11	35.5	1	3.2
Federal Gov't Fleet	5	21.7	16	69.6	2	8.7	0	0.0
Military Fleet	5	50.0	4	40.0	0	0.0	1	10.0
School Buses	1	12.5	3	37.5	4	50.0	0	0.0
Shuttle Service	0	0.0	0	0.0	4	50.0	4	50.0
State Fleet	0	0.0	15	62.5	9	37.5	0	0.0
Taxicab	0	0.0	1	6.7	8	53.3	6	40.0
Transit	0	0.0	8	47.1	8	47.1	1	5.9
USPS	0	0.0	1	33.3	2	66.7	0	0.0
Utility Fleet	2	8.7	15	65.2	6	26.1	0	0.0

Table B-4b. Typical Fleet Vehicle Service Life in Miles—Medium-Duty Vehicles

Fleet Type	up to 50,000 mi.		50,000 to 100,000 mi.		100,000 to 300,000 mi.		300,000 to 500,000 mi.	
	Count	%	Count	%	Count	%	Count	%
All	12	9.5	68	53.5	44	34.7	3	2.4
Private	1	2.4	22	52.4	17	40.5	2	4.8
Public	11	12.9	46	54.1	27	31.8	1	1.2
City Fleet	4	19.1	14	66.7	3	14.3	0	0.0
Delivery	0	0.0	6	40.0	8	53.3	1	6.7
Federal Gov't Fleet	4	23.5	11	64.7	2	11.8	0	0.0
Military Fleet	3	37.5	4	50.0	1	12.5	0	0.0
School Buses	0	0.0	1	25.0	3	75.0	0	0.0
Shuttle Service	0	0.0	1	33.3	1	33.3	1	33.3
State Fleet	0	0.0	11	55.0	9	45.0	0	0.0
Taxicab	0	0.0	1	33.3	2	66.7	0	0.0
Transit	0	0.0	5	38.5	7	53.9	1	7.7
USPS	0	0.0	0	0.0	2	100.0	0	0.0
Utility Fleet	1	4.8	14	66.7	6	28.6	0	0.0

Table B-4c. Typical Fleet Vehicle Service Life in Miles—Light-Heavy-Duty Vehicles

Fleet Type	up to 50,000 mi.		50,000 to 100,000 mi.		100,000 to 300,000 mi.		300,000 to 500,000 mi.	
	Count	%	Count	%	Count	%	Count	%
All	11	9.6	45	39.1	48	41.7	9	7.8
Private	2	5.6	12	33.3	16	44.4	5	13.9
Public	9	11.4	33	41.8	32	40.5	4	5.1
City Fleet	4	19.1	16	76.2	1	4.8	0	0.0
Delivery	0	0.0	2	16.7	6	50.0	4	33.3
Federal Gov't Fleet	2	13.3	5	33.3	8	53.3	0	0.0
Military Fleet	2	33.3	3	50.0	1	16.7	0	0.0
School Buses	0	0.0	0	0.0	8	100.0	0	0.0
Shuttle Service	0	0.0	0	0.0	2	66.7	1	33.3
State Fleet	0	0.0	7	50.0	7	50.0	0	0.0
Taxicab	0	0.0	1	50.0	0	0.0	0	0.0
Transit	1	7.1	2	14.3	6	42.9	4	28.6
USPS	0	0.0	0	0.0	1	100.0	0	0.0
Utility Fleet	2	10.5	9	47.4	8	42.1	0	0.0

Table B-4d. Typical Fleet Vehicle Service Life in Miles—Heavy-Duty Vehicles

Fleet Type	up to 50,000 mi.		50,000 to 100,000 mi.		100,000 to 300,000 mi.		300,000 to 500,000 mi.	
	Count	%	Count	%	Count	%	Count	%
All	15	12.0	27	21.6	41	32.8	42	33.6
Private	3	9.1	7	21.2	9	27.3	14	42.4
Public	12	13.0	20	21.7	32	34.8	28	30.4
City Fleet	4	21.1	12	63.2	2	10.5	1	5.3
Delivery	0	0.0	1	5.9	3	17.6	13	31.0
Federal Gov't Fleet	3	18.8	3	18.8	9	56.3	1	6.3
Military Fleet	2	33.3	1	16.7	3	50.0	0	0.0
School Buses	2	18.2	0	0.0	7	63.6	2	18.2
Shuttle Service	0	0.0	0	0.0	0	0.0	1	100.0
State Fleet	0	0.0	4	26.7	7	46.7	4	26.7
Taxicab	0	0.0	1	100.0	0	0.0	0	0.0
Transit	1	4.6	0	0.0	2	9.1	19	86.4
USPS	0	0.0	0	0.0	2	66.7	1	33.3
Utility Fleet	3	21.4	5	35.7	6	42.9	0	0.0

Table B-5a. Typical Fleet Vehicle Service Life in Years—Light-Duty Vehicles

Fleet Type	3 yr. or less		3 to 7 years		7 to 10 years		more than 10 years	
	Count	%	Count	%	Count	%	Count	%
All	26	12.4	105	50.2	51	24.4	27	12.9
Private	21	23.9	41	46.6	16	18.2	10	11.4
Public	5	4.1	64	52.9	35	28.9	17	14.1
City Fleet	0	0.0	15	60.0	9	36.0	1	4.0
Delivery	12	33.3	14	38.9	6	16.7	4	11.1
Federal Gov't Fleet	2	8.3	17	70.8	4	16.7	1	4.2
Military Fleet	2	2.0	6	60.0	2	20.0	0	0.0
School Buses	0	0.0	2	14.3	5	35.7	7	5.0
Shuttle Service	4	44.4	5	55.6	0	0.0	0	0.0
State Fleet	1	4.3	8	34.8	13	56.5	1	4.3
Taxicab	3	20.0	8	53.3	3	20.0	1	6.7
Transit	0	0.0	15	93.8	1	6.3	0	0.0
USPS	0	0.0	1	11.1	1	11.1	7	77.8
Utility Fleet	2	7.1	14	50.0	7	25.0	5	17.9

Table B-5b. Typical Fleet Vehicle Service Life in Years—Medium-Duty Vehicles

Fleet Type	3 yr. or less		3 to 7 years		7 to 10 years		more than 10 years	
	Count	%	Count	%	Count	%	Count	%
All	6	3.6	66	39.8	65	39.2	29	17.5
Private	4	6.8	25	42.4	19	32.2	11	18.6
Public	2	1.9	41	38.3	46	43.0	18	16.8
City Fleet	0	0.0	9	37.5	13	54.2	2	8.3
Delivery	1	4.2	9	37.5	7	29.2	7	29.2
Federal Gov't Fleet	0	0.0	12	60.0	7	35.0	1	5.0
Military Fleet	2	22.2	3	33.3	2	22.2	2	22.2
School Buses	0	0.0	0	0.0	4	33.3	8	66.7
Shuttle Service	1	20.0	3	60.0	1	20.0	0	0.0
State Fleet	0	0.0	7	35.0	12	60.0	1	5.0
Taxicab	0	0.0	3	100.0	0	0.0	0	0.0
Transit	0	0.0	10	76.9	3	23.1	0	0.0
USPS	0	0.0	0	0.0	5	55.6	4	44.4
Utility Fleet	2	7.4	10	37.0	11	40.7	4	14.8

Table B-5c. Typical Fleet Vehicle Service Life in Years—Light-Heavy-Duty Vehicles

Fleet Type	3 yr. or less		3 to 7 years		7 to 10 years		more than 10 years	
	Count	%	Count	%	Count	%	Count	%
All	3	2.1	28	20.0	62	44.3	47	33.6
Private	1	2.1	13	27.1	20	41.7	14	29.2
Public	2	2.2	15	16.3	42	45.7	33	35.9
City Fleet	0	0.0	6	26.1	12	52.2	5	21.7
Delivery	0	0.0	7	41.2	8	47.1	2	11.8
Federal Gov't Fleet	0	0.0	2	12.5	7	43.8	7	43.8
Military Fleet	2	28.6	2	28.6	1	14.3	2	28.6
School Buses	0	0.0	0	0.0	1	10.0	9	90.0
Shuttle Service	0	0.0	2	66.7	0	0.0	1	33.3
State Fleet	0	0.0	1	6.3	10	62.5	5	31.3
Taxicab	0	0.0	0	0.0	1	50.0	1	50.0
Transit	0	0.0	4	28.6	6	42.9	4	28.6
USPS	0	0.0	0	0.0	5	83.3	1	16.7
Utility Fleet	1	3.9	4	15.4	11	42.3	10	38.5

Table B-5d. Typical Fleet Vehicle Service Life in Years—Heavy-Duty Vehicles

Fleet Type	3 yr. or less		3 to 7 years		7 to 10 years		more than 10 years	
	Count	%	Count	%	Count	%	Count	%
All	2	1.2	22	13.4	51	31.1	89	54.3
Private	0	0.0	16	31.4	21	41.2	14	27.5
Public	2	1.8	6	5.3	30	26.6	75	66.4
City Fleet	0	0.0	2	8.7	9	39.1	12	52.2
Delivery	0	0.0	12	50.0	7	29.2	5	20.8
Federal Gov't Fleet	0	0.0	1	5.6	3	16.7	14	77.8
Military Fleet	2	28.6	1	14.3	1	14.3	3	42.9
School Buses	0	0.0	0	0.0	0	0.0	17	100.0
Shuttle Service	0	0.0	1	50.0	0	0.0	1	50.0
State Fleet	0	0.0	1	5.9	7	41.2	9	52.9
Taxicab	0	0.0	0	0.0	1	100.0	0	0.0
Transit	0	0.0	1	4.6	2	9.1	19	86.4
USPS	0	0.0	0	0.0	8	88.9	1	11.1
Utility Fleet	0	0.0	3	12.5	13	54.2	8	33.3

Table B-6. Number of Vehicles Purchased Annually

Fleet Type	less than 10		11 to 50		51 to 100		101 to 500		more than 500	
	Count	%	Count	%	Count	%	Count	%	Count	%
All	44	19.1	75	32.6	33	14.4	53	23.0	25	10.9
Private	21	22.3	30	31.9	14	14.9	21	22.3	8	8.5
Public	23	16.9	45	33.1	19	14.0	32	23.5	17	12.5
City Fleet	0	0.0	10	40.0	7	28.0	8	32.0	0	0.0
Delivery	9	22.5	10	25.0	6	15.0	9	22.5	6	15.0
Federal Gov't Fleet	7	26.9	5	19.2	1	3.8	8	30.8	5	19.2
Military Fleet	3	27.3	2	18.2	0	0.0	2	18.2	4	36.4
School Buses	5	25.0	10	50.0	2	10.0	3	15.0	0	0.0
Shuttle Service	6	54.6	3	27.3	2	18.2	0	0.0	0	0.0
State Fleet	1	4.0	8	32.0	4	16.0	7	28.0	5	20.0
Taxicab	5	35.7	7	50.0	1	7.1	1	7.1	0	0.0
Transit	4	19.1	10	47.6	4	19.0	3	14.3	0	0.0
USPS	3	37.5	0	0.0	1	12.5	1	12.5	3	37.5
Utility Fleet	1	3.5	10	34.5	5	17.2	11	37.9	2	6.9

Appendix C
Additional Summary Data Related to AFV and HEV Experience

Table C-1. Summary of Overall Experience with AFVs

Fleet Type	Very Favorable		Favorable		Neutral		Negative		Very negative	
	Count	%	Count	%	Count	%	Count	%	Count	%
All	25	14.0	70	39.1	43	24.0	39	21.8	2	1.1
Private	7	12.5	21	37.5	16	28.6	11	19.6	1	1.8
Public	18	14.6	49	39.8	27	22.0	28	22.8	1	0.8
City Fleet	2	7.4	11	40.7	9	33.3	5	18.5	0	0.0
Delivery	4	22.2	3	16.7	5	27.8	5	27.8	1	5.5
Federal Gov't Fleet	6	27.3	5	22.7	5	22.7	6	27.3	0	0.0
Military Fleet	1	10.0	5	50.0	1	10.0	3	30.0	0	0.0
School Buses	2	22.2	4	44.4	2	22.2	2	11.1	0	0.0
Shuttle Service	1	12.5	4	50.0	2	25.0	1	12.5	0	0.0
State Fleet	2	8.0	12	48.0	6	24.0	4	16.0	1	4.0
Taxicab	0	0.0	1	25.0	3	75.0	0	0.0	0	0.0
Transit	5	25.0	7	35.0	2	10.0	6	30.0	0	0.0
USPS	0	0.0	5	50.0	2	20.0	3	30.0	0	0.0
Utility Fleet	2	7.7	13	50.0	6	23.1	5	19.2	0	0.0

Table C-2. Reasons for Implementing Advanced Technology Vehicles by Specific Fleet Type

Fleet Type	Economic		Environmental		Corporate Image		Regulatory Compliance		All Reasons		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
City Fleet	11	14.3	24	31.2	16	20.8	21	27.3	5	6.5	77	100
Delivery	28	19.0	33	22.4	34	23.1	34	23.1	18	12.2	147	100
Federal Gov't Fleet	11	13.3	23	27.7	19	22.9	22	26.5	8	9.6	83	100
Military Fleet	3	10.3	10	34.5	7	24.1	7	24.1	2	6.9	29	100
School Buses	18	26.1	18	26.1	12	17.4	13	18.8	8	11.6	69	100
Shuttle Service	11	22.9	9	18.8	10	20.8	10	20.8	8	16.7	48	100
State Fleet	11	15.9	21	30.4	11	15.9	22	31.9	4	5.8	69	100
Taxicab	12	26.7	11	24.4	11	24.4	7	15.6	4	8.9	45	100
Transit	8	12.1	21	31.8	17	25.8	15	22.7	5	7.6	66	100
USPS	6	15.4	10	25.6	8	20.5	10	25.6	5	12.8	39	100
Utility Fleet	16	18.2	22	25.0	17	19.3	22	25.0	11	12.5	88	100
Total	135	17.8	202	26.6	162	21.3	183	24.1	78	10.3	760	100

Table C-3. Time Frame in Which HEVs Might Be Incorporated Into Fleets, by Specific Fleet Type

Fleet Type	5 yr or less		5 to 10 years		more than 10 yr.		Never		Do not know	
	Count	%	Count	%	Count	%	Count	%	Count	%
All	54	22.1	65	26.6	18	7.4	34	13.9	73	29.9
Private	9	8.9	21	20.8	10	9.9	18	17.8	43	42.6
Public	45	31.7	44	30.8	8	5.6	16	11.2	30	21.0
City Fleet	9	32.1	8	28.6	1	3.6	3	10.7	7	25
Delivery	3	6.6	8	17.8	4	8.9	6	13.3	24	53.3
Federal Gov't Fleet	6	23.1	7	26.9	2	7.7	4	15.4	7	26.9
Military Fleet	7	63.6	1	9.1	0	0	0	0	3	27.3
School Buses	2	10	7	35	3	15	7	35	1	5
Shuttle Service	1	9.1	3	27.3	1	9.1	1	9.1	5	45.4
State Fleet	8	30.8	8	30.8	1	3.9	1	3.9	8	30.8
Taxicab	0	0	3	20	3	20	5	33.3	4	26.7
Transit	7	31.8	10	45.4	1	4.6	1	4.6	3	13.6
USPS	6	60	3	30	0	0	0	0	1	10
Utility Fleet	5	16.7	7	23.3	2	6.7	6	20	10	33.3

Figure C-1. Information Needs Summary by Information Category—All Responses

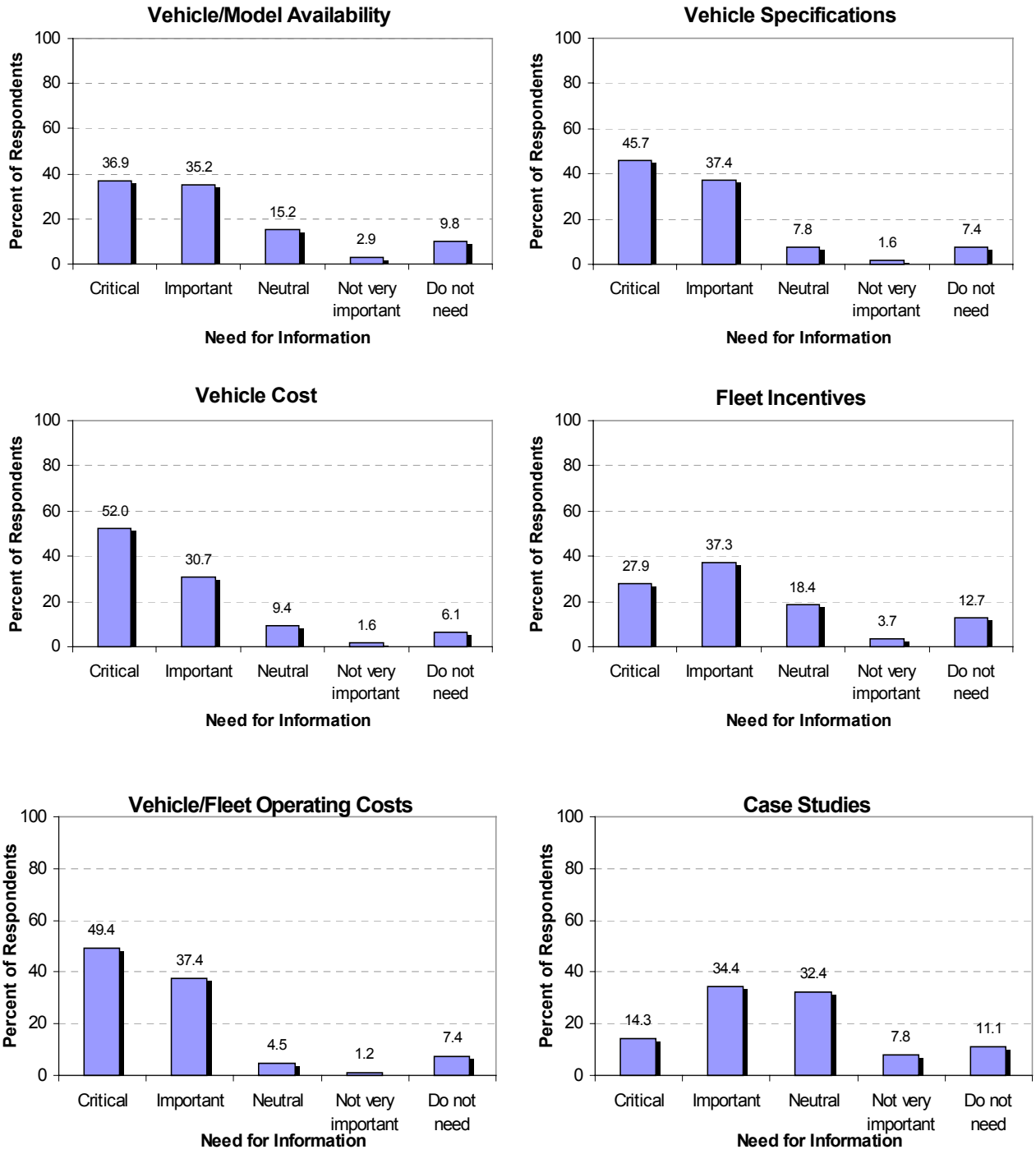
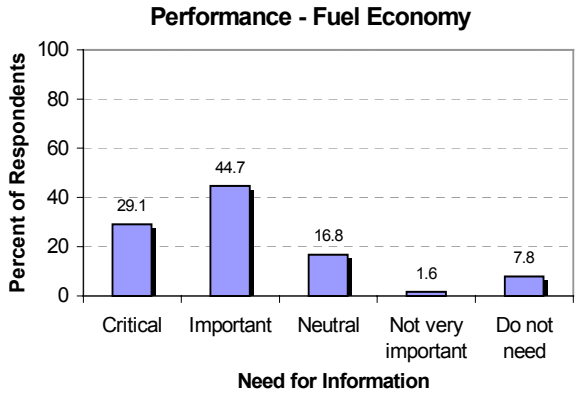
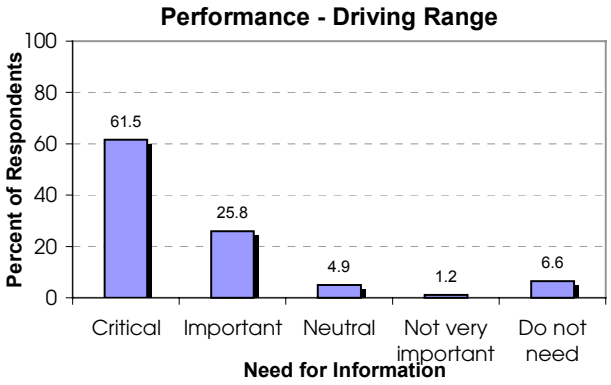
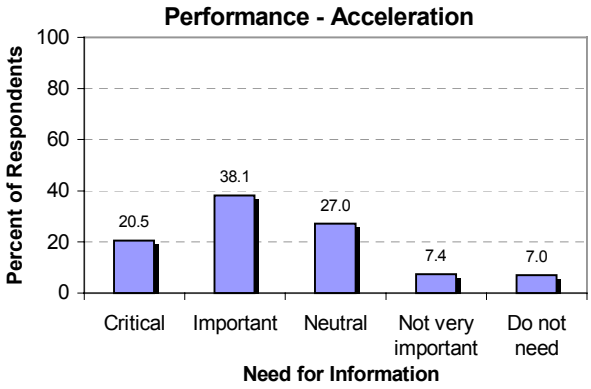
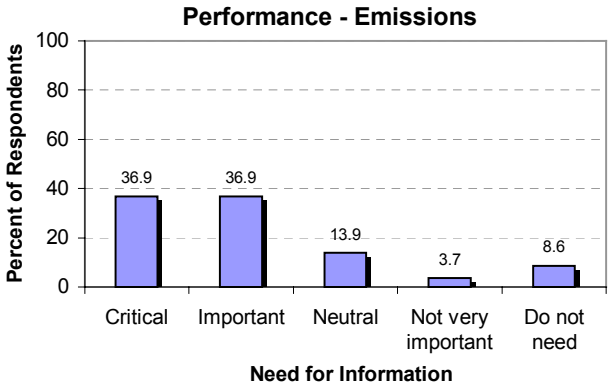


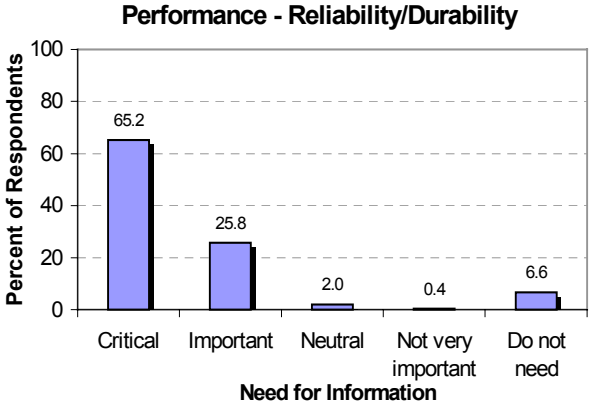
Figure C-1. Information Needs Summary by Information Category – All Responses
(continued)











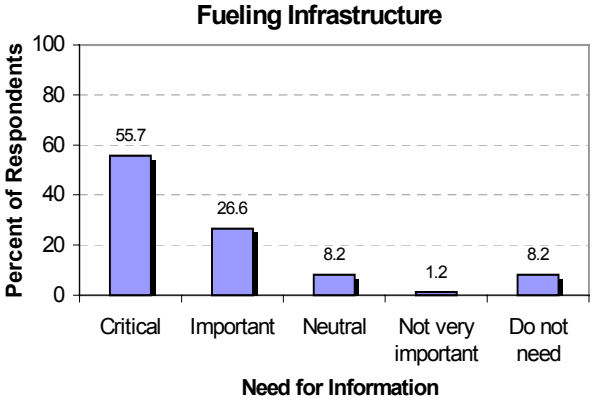
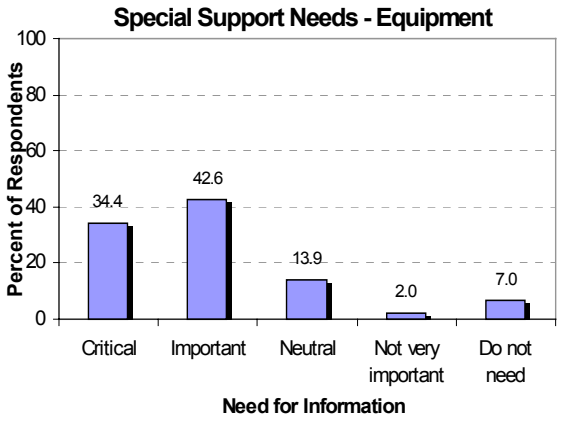
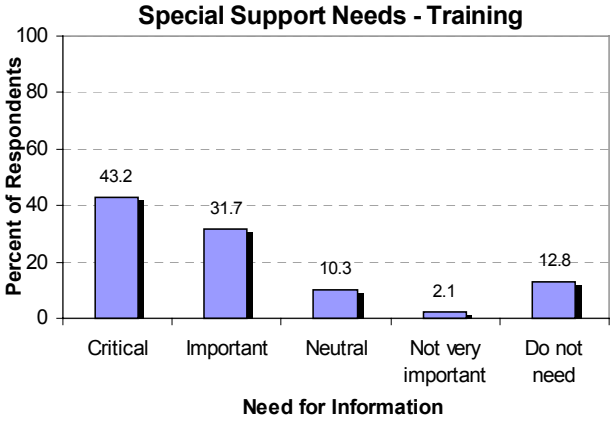
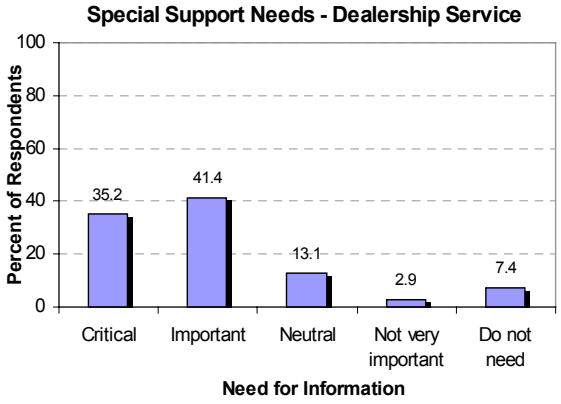
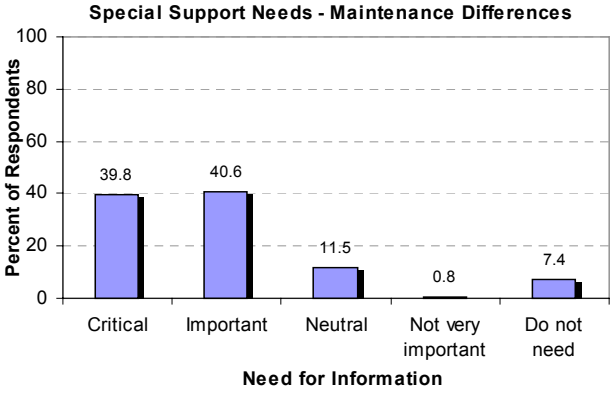


Figure C-1. Information Needs Summary by Information Category—All Responses
(concluded)









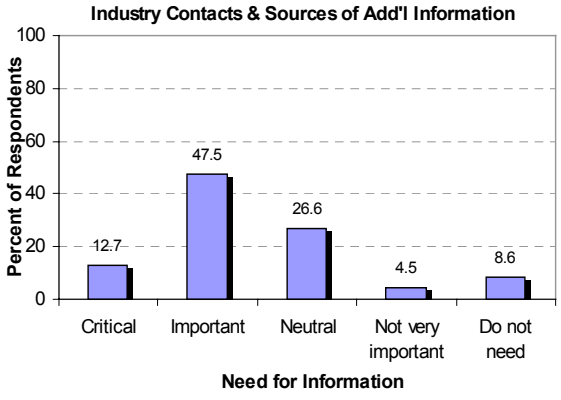


Figure C-2. Information Needs Summary by Information Category—Responses Grouped by Public and Private Fleet

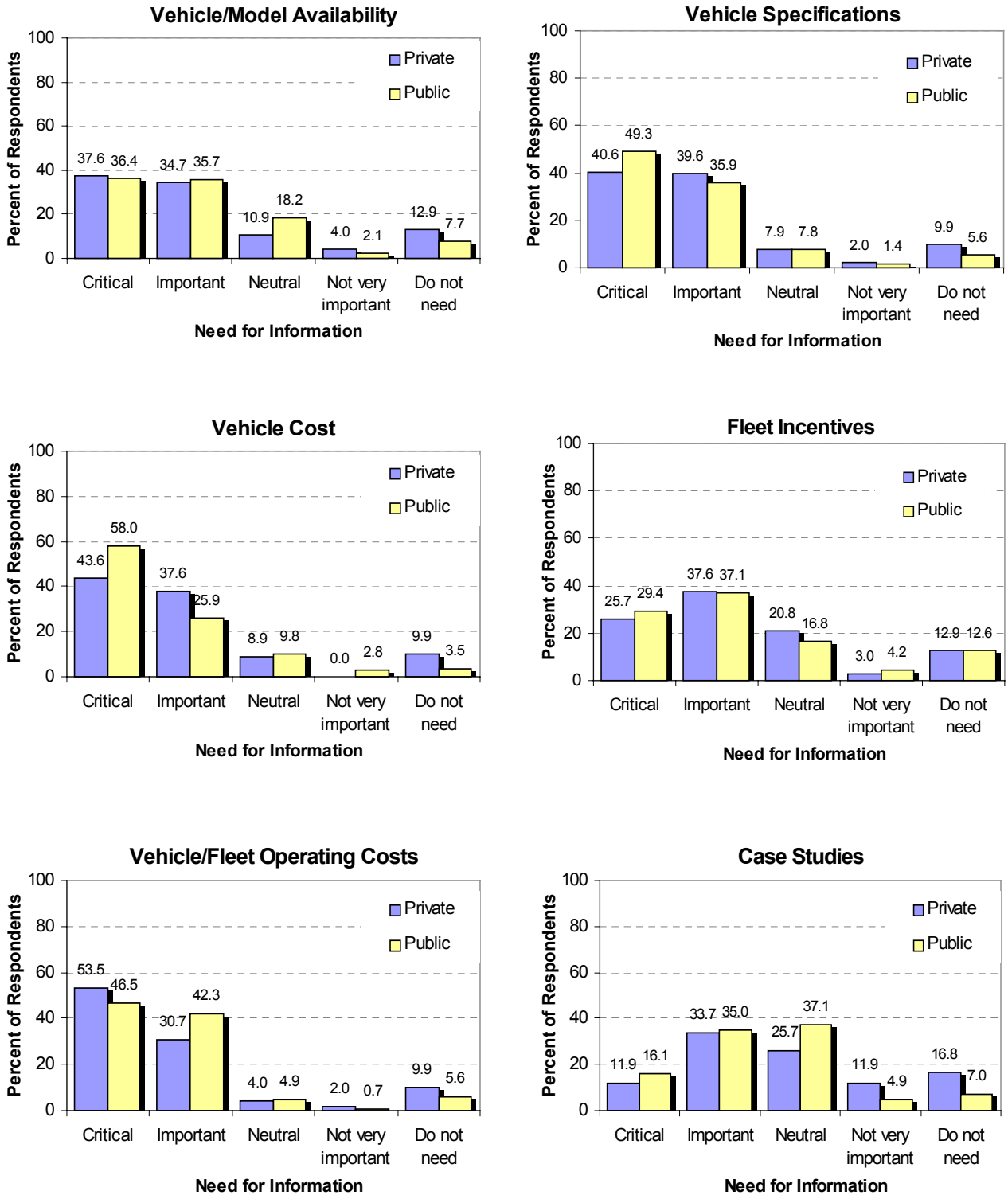


Figure C-2. Information Needs Summary by Information Category—Responses Grouped by Public and Private Fleet (continued)

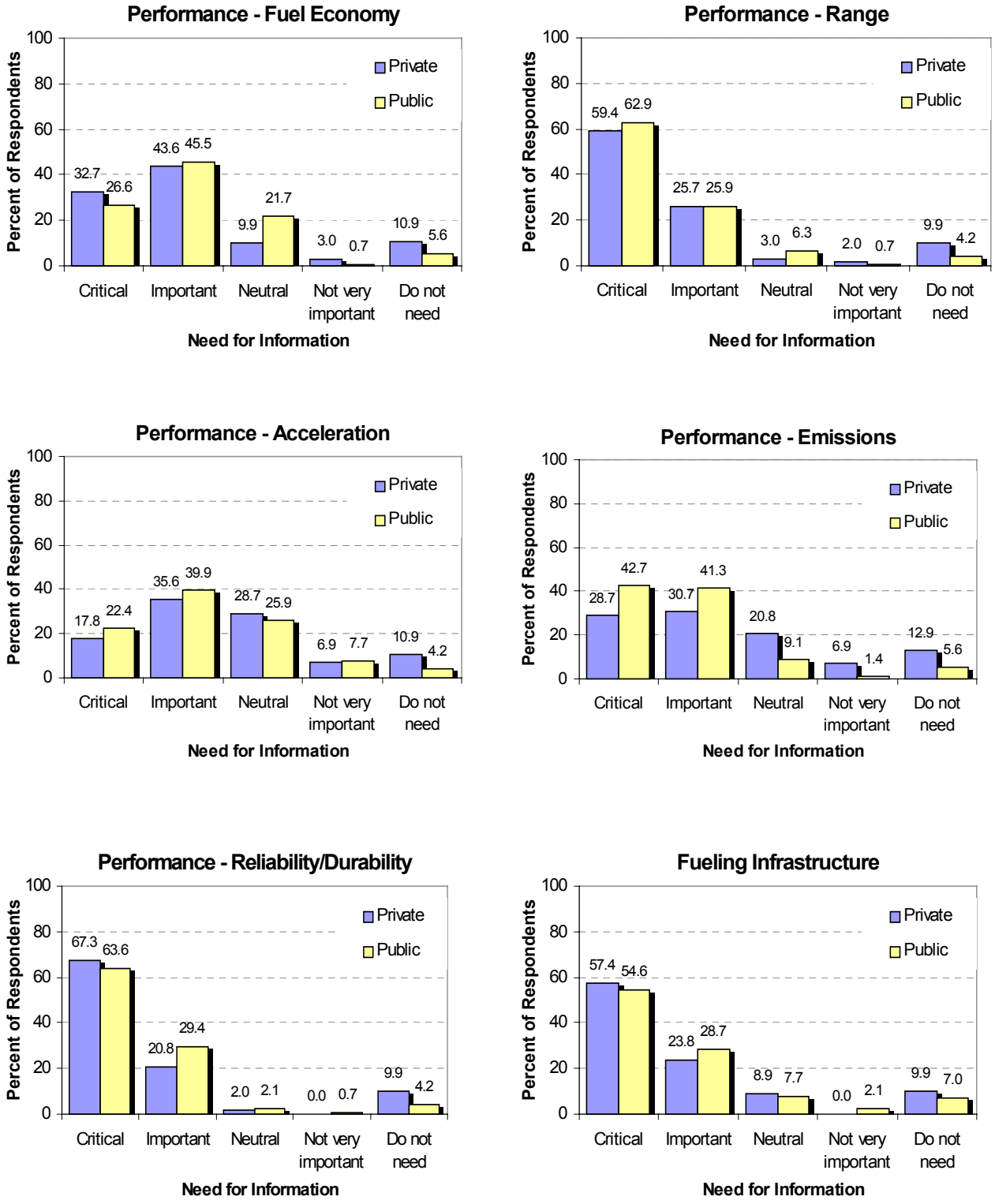
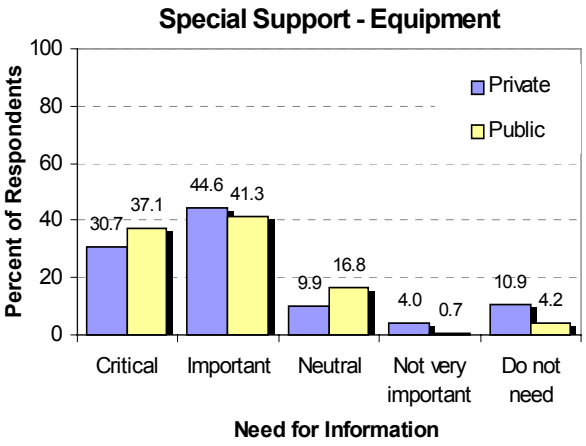
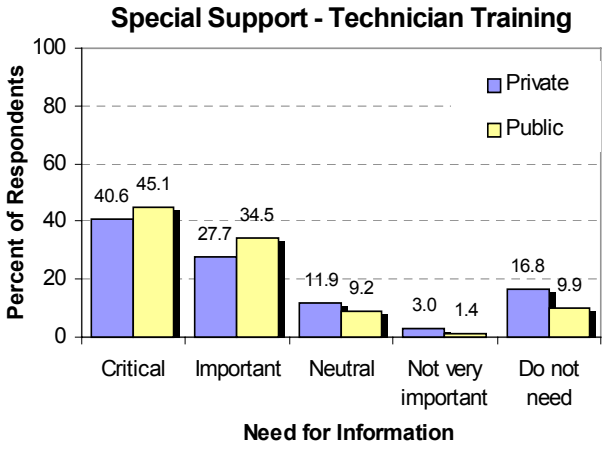
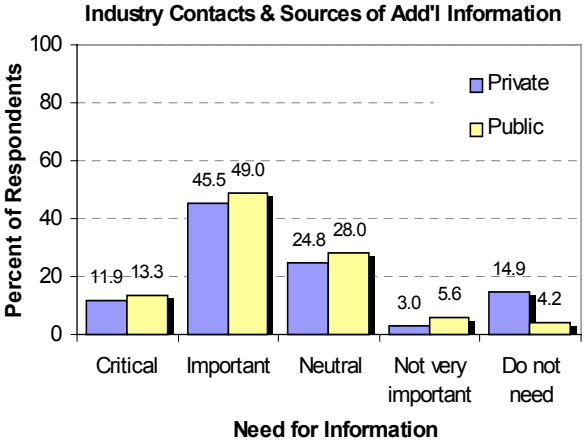


Figure C-2. Information Needs Summary by Information Category—Responses Grouped by Public and Private Fleet (concluded)







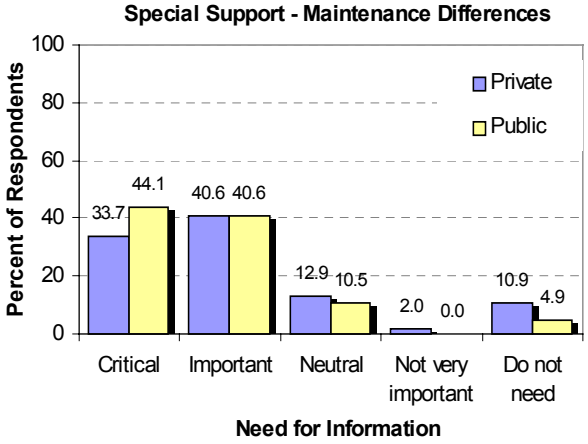


Table C-4. Information Categories Rated as "Critical" or "Important" to Making HEV Purchase Decisions for Each Specific Fleet Type*

Fleet Type	Vehicle/Model Availability		Vehicle Specifications		Vehicle Cost		Fleet Incentives		Operating Cost		Case Studies	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
City Fleet	23	**82.2**	24	**85.7**	26	**92.9**	20	71.4	26	**92.9**	11	39.3
Delivery	32	71.1	39	**86.7**	38	**84.4**	33	73.3	39	**86.7**	24	53.3
Federal Gov't	19	73.1	21	**80.8**	19	73.1	15	57.7	23	**88.5**	16	61.5
Military	7	63.6	7	63.6	8	72.7	4	36.4	7	63.6	3	27.3
School Buses	12	60.0	18	**90.0**	17	**85.0**	16	**80.0**	19	**95.0**	9	45.0
Shuttle Service	9	**81.8**	8	72.7	8	72.7	7	63.6	10	**90.9**	5	45.5
State Fleet	18	69.2	22	**84.6**	25	**96.2**	21	**80.8**	22	**84.6**	16	61.5
Taxicab	10	66.7	11	73.3	12	**80.0**	8	53.3	11	73.3	6	40.0
Transit	17	**77.3**	21	**100.0**	19	**86.4**	14	63.6	21	**100.**	15	68.2
USPS	7	70.0	8	**80.0**	6	60.0	5	50.0	8	**80.0**	3	30.0
Utility Fleet	22	73.3	23	**76.7**	24	**80.0**	16	53.3	25	**83.3**	11	36.7

Fleet Type	Performance - Fuel Economy		Performance - Range		Performance - Acceleration		Performance - Emissions		Performance - Reliability		Fueling Infrastructure	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
City Fleet	21	**75.0**	25	**89.3**	18	64.3	28	**100.**	28	**100.0**	23	**82.1**
Delivery	35	**77.8**	38	**84.4**	28	62.2	30	66.7	40	**88.9**	37	**82.2**
Federal Gov't	21	**80.8**	22	**84.6**	13	50.0	20	**76.9**	25	**96.2**	22	**84.6**
Military Fleet	6	54.5	9	**81.8**	5	45.5	8	72.7	8	72.7	8	72.7
School Buses	13	65.0	18	**90.0**	12	60.0	16	**80.0**	19	**95.0**	17	**85.0**
Shuttle Service	10	**90.9**	11	**100.0**	6	54.5	7	63.6	11	**100.0**	11	**100.0**
State Fleet	16	61.5	24	**92.3**	19	73.1	18	69.2	24	**92.3**	23	**88.5**
Taxicab	10	66.7	11	73.3	6	40.0	6	40.0	12	**80.0**	9	60.0
Transit	19	**86.4**	22	**100.0**	17	**77.3**	21	**95.5**	21	**95.5**	18	**81.8**
USPS	7	70.0	7	70.0	5	50.0	9	**90.0**	8	**80.0**	8	**80.0**
Utility Fleet	22	73.3	26	**86.7**	14	46.7	17	56.7	26	**86.7**	25	**83.3**

Fleet Type	Special Support - Equipment		Special Support - Training		Special Support - Dealership Service		Special Support - Maintenance Differences		Contacts for Add'l Information	
	Count	%	Count	%	Count	%	Count	%	Count	%
City Fleet	22	**78.6**	27	**96.4**	26	**92.9**	23	**82.2**	17	60.7
Delivery	35	**77.8**	28	62.2	33	73.3	36	**80.0**	32	71.1
Federal Gov't Fleet	20	**76.9**	15	57.7	22	**84.6**	23	**88.5**	12	46.2
Military Fleet	8	72.7	8	72.7	6	54.5	8	72.7	8	72.7
School Buses	16	**80.0**	17	**85.0**	16	**80.0**	18	**90.0**	15	**75.0**
Shuttle Service	9	**81.8**	10	**90.9**	11	**100.**	9	**81.8**	7	63.6
State Fleet	20	**76.9**	20	**76.9**	24	**92.3**	23	**88.5**	14	53.8
Taxicab	10	66.7	10	66.7	4	26.7	8	53.3	6	40.0
Transit	21	**95.5**	19	**90.5**	19	**86.4**	19	**86.4**	18	**81.8**
USPS	5	50.0	7	70.0	6	60.0	7	70.0	5	50.0
Utility Fleet	22	73.3	21	70.0	20	66.7	22	73.3	13	43.3

* **bolded** numbers are categories where 75% or more of respondents indicated this information is critical or important

Table C-5. Summary of Current Primary Sources for Advanced Technology Vehicle and Trends Information

Fleet Type	Vehicle Mfgrs.		Federal Gov't		Trade Publications		Local Groups		Other Sources	
	Count	%	Count	%	Count	%	Count	%	Count	%
All	140	57.4	138	56.6	214	87.7	106	43.3	112	46.1
Private	55	54.4	44	43.6	88	87.1	29	28.7	39	38.6
Public	85	59.4	94	65.7	126	88.1	77	53.8	73	51.4
City Fleet	19	67.8	16	57.1	27	96.4	17	60.7	12	42.9
Delivery	26	57.8	22	48.9	39	86.7	16	35.6	19	42.2
Federal Gov't Fleet	16	61.5	21	88.7	22	84.6	16	61.5	13	50.0
Military Fleet	7	63.4	8	72.7	5	45.4	2	18.2	6	54.6
School Buses	6	30.0	8	40.0	18	90.0	9	45.0	7	36.8
Shuttle Service	6	54.6	3	27.3	10	90.9	3	27.3	4	36.4
State Fleet	21	80.8	14	53.8	25	96.2	14	53.8	13	50.0
Taxicab	6	40.0	4	26.7	11	73.3	3	20.0	6	40.0
Transit	9	40.9	18	81.8	21	95.4	14	63.6	15	68.2
USPS	7	70.0	9	90.0	8	80.0	5	50.0	7	70.0
Utility Fleet	17	56.7	15	60.0	28	93.3	7	23.3	10	33.3

Table C-6. Summary of Preferred Sources for Advanced Technology Vehicle and Trends Information

Fleet Type	Industry Conferences		Industry Publications		Gov't Publications		Electronic Newsletters		Web/Internet		Alt. Fuels/Other Hotlines		Direct Mail		Other	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
All	140	42.2	219	89.8	175	71.7	143	59.1	179	73.4	96	39.5	164	67.5	41	16.9
Private	52	51.5	88	87.1	49	48.5	56	55.4	66	65.4	32	31.7	66	65.4	14	14.0
Public	88	62.4	131	91.6	126	88.1	87	61.7	113	79.0	64	45.1	98	69.0	27	18.9
City Fleet	16	59.3	25	89.3	26	92.9	16	57.1	21	75	12	42.9	23	85.2	3	10.7
Delivery	23	51.1	41	91.1	24	53.3	31	68.9	33	73.3	14	31.1	32	71.1	6	13.3
Federal Gov't Fleet	15	60.0	23	88.5	22	84.8	18	69.2	22	84.6	11	42.3	14	53.8	6	23.1
Military Fleet	9	81.8	7	63.6	10	90.9	6	60.0	9	81.8	6	54.6	7	63.6	4	36.4
School Buses	12	60	20	100.0	16	80.0	11	55.0	16	80.0	11	55.0	12	60.0	2	10.0
Shuttle Service	4	36.4	9	81.8	6	54.6	7	63.6	7	63.6	5	45.4	8	72.7	2	18.2
State Fleet	12	46.2	25	96.2	23	88.5	12	46.2	19	73.1	10	38.5	22	84.6	6	23.1
Taxicab	6	40.0	10	66.7	5	33.3	1	6.7	7	46.7	3	20.0	9	60.0	2	14.3
Transit	15	68.2	22	100.0	20	90.9	16	76.2	17	77.3	9	42.9	15	68.2	4	18.2
USPS	9	90.0	9	90.0	9	90.0	8	80.0	9	90.0	5	50.0	5	50.0	2	20.0
Utility Fleet	19	63.3	28	93.3	14	46.7	17	56.7	19	63.3	10	33.3	17	56.7	4	13.3